Reviewer’s report

Title: Influence of patient race on administration of analgesia by student paramedics

Version: 1 Date: 15 Apr 2019

Reviewer: Jonathan Green

Reviewer’s report:

Reviewer 1

Comment: This manuscript raises several issues which are currently inadequately explained. The principal issue is the deviation from the approach that I would expect i.e. that the principal researcher would access local data (whether other data is acquired or not). I would expect this data to refer to routine practice, and to measure the object of the study as directly as possible. In fact, the population studied was in the US, but the principal author who "conceived the study design, undertook the data analysis and drafted the report" appears to be based in Australia; as was the research ethics committee that reviewed the study design. In order to provide reassurance regarding the quality and reliability of the study in general, this issue warrants some explanation.

Response: Thank you for your feedback. The authors chose to investigate the influence of patient race on administration of analgesia by student paramedics in the United States of America as patient race is frequently recorded in this practice setting. The US Affordable Care Act (2010) requires standardized collection of race/ethnicity across federal health care databases. Although this does not apply to the dataset used for this study, the reported frequency of race may reflect this national approach to recording race in healthcare in the US. Patient race is not routinely recorded by paramedics in Australia nor is the collection of this data mandated for ambulance services, making it impracticable to conduct this type of retrospective study in Australia.

1. New comment: Thank you for your explanation. Withstanding the restriction of word count, I believe this paper would benefit from a summary of this explanation.

Comment: It also raises the question of whether permissions were required/ sought in the US and who owns/ validated the data?

Response: The section of the manuscript headed "Study setting" affirms that the use of "de-identified patient care data generated by student paramedics for the fulfilment of assessment requirements was governed by an existing Institutional Review Board approval from Inver Hills Community College, Inver Grove Heights, Minnesota. Approval to use this existing collection of non-identifiable human data for this study was granted by the Human Research Ethics Committee of the University of the Sunshine Coast, approval number E/16/058." This committee operates in accordance with the Australian National Statement on Ethical Conduct in Human
Research. It should be noted that this dataset has been used to answer other research questions regarding student paramedic practice and has been referenced in several studies, for example:


2. New comment: On reflection, you have made the nature/type of data used clear - to the extent that the reader can make a reasonable judgment regarding its likely quality.

Comment: The study only appraises student data and argues that equivalent data, regarding qualified paramedics, is hard to acquire. I find it surprising that the recording of analgesic administration is not routine in any advanced EMS system. Certainly, I would expect qualified paramedics to be just as likely as students to record the occurrence of trauma. Also, the authors make no mention of any restrictions to analgesic administration which may apply to pre-registration students (and which may differ locally), and the impact this may have had on the study. Although the bias resulting from the sole use of student data is implied by the clear acknowledgment of this narrow data source, I would argue that the rationale requires further clarification.

Response: The authors acknowledge that analgesic administration is usually recorded on patient care records generated by paramedics. For this study the researchers sought to use records of student paramedic analgesic administration as this is the first large study that addresses the research questions from a student perspective using national data rather than data from individual EMS. The "Study setting and population" section of this paper states that "Other national datasets of case records that include paramedic treatment such as the National Emergency Medical Services Information System (NEMSIS) lack reliable data fields required to study variables that may be associated with analgesic administration." In our study students were working under supervision in order to deliver patient care within a scope of practice that includes parenteral analgesia for the management of pain. Information about the paramedic student scope of practice has been added to the manuscript and a reference added.

3. New comment: Thank you for the addition here, which is helpful. However, I believe the paper would benefit from further clarification. Would you be able to provide further information regarding which 'reliable data fields' were not available in "Other national datasets" / what evidence was used to draw this conclusion? As I've already said, I don't have a problem with the database per se, but I don't think the reasons why you chose to use it rather than a standard EMS dataset are yet sufficiently clear.

Comment: I agree that the use of 'trauma' as a proxy for pain has the clear advantages of having a high likelihood of being recorded and a high association with pain. However, the authors imply that their decision to choose this proxy over generic pain scoring, as the option of least bias, is evidence based. This evidence should be referenced. I suspect that the dataset was chosen
primarily for convenience. If this is so, it should be more clearly acknowledged, and better set in the context of alternatives.

Response: The decision to use evidence of trauma as a surrogate for the likelihood of pain was a pragmatic approach due to the infrequent recording of pain severity in this study setting. A reference to a large US study of paramedic management of pain has been added to the manuscript. This study found "pain scores were missing for more than half the study population".

4. New comment: Thank you for this addition.

Specific comments

I suggest the word 'ethnicity' rather than 'race', throughout.

Response: The data is consistent with the United States Census Bureau classification of race based on guidelines provided by the U.S. Office of Management and Budget. This source states that the categories "reflect a social definition of race recognized in this country and not an attempt to define race biologically, anthropologically, or genetically. In addition, it is recognized that the categories of the race item include racial and national origin or sociocultural groups." https://www.census.gov/topics/population/race/about.html

The authors have concluded that the most appropriate term to categorize data in this study is "race".

5. New comment: Thank you for this persuasive response.

Comment: Although the statistical analysis appears to be robust and appropriate, there is no clear evidence of input from a statistician. As such, review by a statistician may be required. This should include consideration of the absence of power calculations, particularly as the numbers of some ethnic groups appear small.

Response: The analysis of the data was supported by Dr Rebecca Coates. Dr Coates is a statistician with extensive experience in questionnaire design and analysis of qualitative and quantitative data, currently working as a statistician with the Commonwealth Scientific and Industrial Research Organisation. This support is referenced in the acknowledgements section of the manuscript.

6. New comment: Thank you for this clarification. It would be reassuring if Dr Coates was included as an author, or at least if her affiliation is made clear.
Comment: References 1 & 2 both 2003 - anything more recent?

Response: These are widely cited references, and although published more than 10 years ago are still very relevant.

7. New comment: Thank you for your response. I have no problem with the inclusion of these references, but it would increase the relevance of the paper if some more recent references were included (if available).

Comment: P4, l8 Add 'US' (US institute of medicine)

Response: Change made.

8. New comment: Thank you.

Comment: Confidence in the dataset would be supported by the inclusion of a patient flow chart, detailing the application of the inclusion criteria.

Response: Thank you for this recommendation. The authors believe that the exclusion criteria and outcomes after application of criteria are adequately described within the text.

9. New comment: The main aspect of this which requires further detail is the drop from 290,670 unique cases to 59,915 cases: "After applying inclusion criteria". As you say, this could be accounted for in the text if preferred, but a breakdown of numbers meeting each exclusion criterion would be appreciated.

Comment: P12, l17 influences

Response: Change made.

Comment: P13, l60 Is this statement accurate, or does it need to refer specifically to the statistically significant groups (rather than to 'non-Caucasian') e.g. African American/Hispanic?

Response: The authors have checked this statement and can confirm that it is correct.

10. New comment: Thank you for checking this.

Comment: P14, l15 Does this sentence need to be made more specific e.g. by adding '...in pain management/ patient treatment'? The discussion is somewhat speculative and should be restricted to clearly referenced comments.

Response: The sentence has been modified to include "associated with pain management."
With these changes, I believe this will be a well-written manuscript, which will contribute to an important area of research. This is particularly the case as, in my experience, the rate of ethnicity recording (over 2/3 of cases) is actually unusually high.

11. Thank you for the work that has been carried out in response to my previous comments. I believe it would be appropriate to publish this paper in its current form. However, as I have described in the new comments above, in my opinion there remain several opportunities to increase the robustness and usefulness of this paper still further. I look forward to reading the finished article.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
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Yes

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If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

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